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H. EIGENMANN; "Darwin and paleontology," by H. F. OSBORN; and "Evolution and psychology," by G. STANLEY HALL.

These addresses, by men whose work and writings are concerned with various phases of animal life, deal with problems of wide interest, but in the main they are from the point of view of the zoologist rather than of the botanist, and the material for illustration is largely drawn from animal biology. One gets the impression in reading the different essays that often the point of view of the authors is all too narrow; it is that of the advocate or pleader seeking undue prominence for a certain phase of the evolution problem, rather than that of a man of science considering the phenomena from a broad, impartial point of view.

On the whole, however, the papers are clear, concise, and very much to the point. Due allowance being made for the standpoint from which the individual author took his departure, they present very fairly the average opinions held by the various workers in different fields today. Probably the lay reader will get from the volume what every biologist knows to be true, that the problems of evolution are no longer in the simple state where one factor can be held to explain everything, but that many more factors must be brought in and all harmonized before the evolution question will assume a more unified aspect. He can hardly fail to see clearly that the fact of evolution is beyond dispute, and that it is the method of evolution which is now under discussion.—W. L. TOWER.

Report of American Breeders' Association

The Fifth Annual Report of the American Breeders' Association² maintains the high standard which has been shown by all the previous reports of this important organization, and without question contains the most important body of experience and speculation dealing with matters of heredity and breeding as well as of the new science of "eugenics" to be found in America. The present volume is in several respects an improvement over any previous one. A number of useful summaries of breeding work in different crops are given in the form of committee reports, the most important of these dealing with alfalfa, apples, wheat, sugar cane, and tobacco. Special methods for the conduct of practical breeding work in corn, alfalfa, wheat, and sorghum are given. Of over eighty separate articles contained in the volume nearly half have to do with plant breeding, about one-third with animal breeding, and smaller numbers with eugenics, the theory of heredity, and other allied subjects. The most important papers, from a theoretical point of view, are "Some observations in telegony" by E. H. RILEY; "Another mode of species forming," by LUTHER BURBANK; "Some cytological aspects of cotton breeding," by LAWRENCE BALLS; "Characteristics of Wealthy apple seedlings," by W. T. MACOUN; "Clonal or bud-variation," by HERBERT J. WEBBER; "What are 'factors' in Mendelian explanations," by T. H. MORGAN; "Factors for mottling in beans," by R. A. EMERSON; and "The effect of different methods of selection on the fixation of hydrids," by W. J. SPILLMAN. There are

² American Breeders' Association. Vol. 5. pp. 420. July 1909. Washington, D. C.

also excellent discussions of work in the production of disease-resistant varieties of flax and wheat by H. L. BOLLEY, and of rice by CHARLES E. CHAMBLISS.

The volume is illustrated with about seventy cuts and diagrams, most of the former being good half-tone engravings. The book is printed on rather cheap paper, but is well bound. It is marred by an undue number of typographical errors, owing to the unfortunate fact that the various papers were not submitted to their authors for correction. The volume closes with a directory of the members of the association, now numbering something over 1200, followed by subject and author indexes to the articles contained in the volume. No biological library can afford to be without these annual volumes, and every one interested in any subject related to heredity or breeding should not fail to become a member of the organization.—GEO. H. SHULL.

Floral biology

Under the general direction of Dr. TOULOUSE, Doin & Fils, Paris, have undertaken the publication of an *Encyclopédie scientifique*. It is divided into 40 sections, each in charge of a special director, and the completed work will comprise about 1000 volumes, each one of which will be a scientific monograph. The classification is exceedingly interesting, botany being represented by three of the 40 sections as follows: 15, *Physiologie et pathologie végétales*; 22, *Botanique*; 35, *Botanique appliquée et agriculture*; not to mention other sections entitled *Biologie*, *Physiologie*, *Pathologie*, etc., which inferentially contain no botany. The section of plant physiology and pathology is under the special direction of L. MANGIN, and is to include 13 monographs, the first one of which to appear is on "Floral biology," by PÉCHOUTRE.³

The boundaries of the subject are vague, but after a historical introduction the author presents his material in two parts: (1) Sex and sexual elements, and (2) Pollination and floral structures. The topics of the second part are obvious, and the usual information concerning cleistogamy, dichogamy, etc., is presented as fully as 175 pages will permit, and presumably in a form suited to the prospective audience. Just what may be treated in such a volume under the head of "sex and sexual elements," however, is not so self-evident. In this case the titles of the six chapters are in substance as follows: the separation of sexes in flowering plants; the influence of external agents on the determination of sex in dioecious plants; the phylogeny of the separation of sexes; the transformation of "hermaphrodite" plants into dioecious plants, including "slow variation or mutation;" the sexual elements of "phanerogams," including protection of pollen, formation of gametes, the development of the pollen tube, and fertilization; the dissociation of the vegetative and sexual activities of pollen.

Taking the book as a whole, it is conspicuous for its lack of perspective, perhaps it would be better to say its curious perspective; for its material of very

³ PÉCHOUTRE, F., *Biologie florale*. 12 mo. pp. 369. figs. 82. Paris: Octave Doin & Fils. 1909. 5/r.